CLOSURE FOR VACUUM INSULATED VESSELS

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This invention relates to closures for the open mouths or necks of containers and particularly to closures for containers including vacuum insulated bottles or flasks commonly called fillers. More especially, the invention is concerned with an improved form of the closure illustrated and described in my co-pending application Serial No. 403,841, filed January 25, 1954, now Patent No. 2,830,722, and assigned to the same assignee as is this invention, which is particularly suitable for use in connection with fillers having large size open mouths.

It has been found that sometimes when using a closure of the type illustrated in my co-pending application for a large mouthed container in which hot liquids or other materials are contained, the stopper portion of the closure is deformed by the pressure built up within the filler by the hot, stored materials and leakage results. Furthermore, it has been found that the deformation is sometimes permanent which precludes the closure from any subsequent effective sealing.

In accordance with this invention, I have overcome this problem by providing the closure with a reinforcing section that will prevent substantial deformation of the stopper portion thereof as a result of the pressure built up within the filler. While my invention contemplates the provision of this reinforcing section on either the stopper portion of the closure or the cover insert therefor, the former construction has a slight added advantage in that the reinforcing section tends to rigidize the portion thereof which enters the mouth of the filler and is directly subjected to the pressure therein as well as to the stored material when the container is in other than vertical position.

In the accompanying drawings in which I have illustrated two forms of my invention:

Fig. 1 is an elevation partly in section showing the upper portion of a vacuum insulated container with my improved closure inserted in the mouth thereof, the aforementioned reinforcing section being in this form integral with the stopper portion of the closure;

Fig. 2 is a vertical cross-section of a modified form of improved closure in which the reinforcing section is integral with the cover insert member thereof; and

Fig. 3 is a fragmentary vertical section showing a stopper of this invention adapted for "snap on" positioning.

The vacuum insulated bottle or container of Fig. 1 is much the same as that disclosed in my co-pending application Serial No. 466,023, filed November 1, 1954, and assigned to the same assignee as is this invention and now abandoned, in that it includes a pouring lip or pourer 10 which comprises the invention of that application. However, the double-walled vacuum insulated filler 11 illustrated has a substantially broader mouth than does that of the aforementioned application. The container also includes a case 12 surrounding filler 11 and a breast member 13 threaded into the upper end of casing 12 and having an intumescence flange 13' overlying an outwardly extending flange of pouring lip 10 to retain the latter properly in position around the neck of filler 11. As pointed out in my aforementioned application, the pouring lip also acts to resiliently position and maintain the upper end of filler 11 properly within the casing. My improved closure as illustrated in Fig. 1 comprises a stopper portion 14 entering its mouth and engaging the upper rim portion of the inner wall of filler 11.

Insert 15 is adapted to span the upper open end of stopper portion 16 of stopper 14 and is adapted to be nonremovably (in normal use) maintained thereacross by having an outwardly projecting bead 20 around its edge received within an undercut 21 just beneath the upper end of stopper portion 16.

A substantially cylindrical reinforcing section 22 is formed integrally with the bottom wall of stopper portion 16 of stopper 14 and extends therefrom toward insert 15. It is of sufficient length so that its outer edge or rim is closely adjacent to the inner face of the insert.

In addition to rigidizing the bottom wall of stopper portion 16 of the closure, thereby making it better able to resist deformation as a result of pressures built up within the filler 11 primarily as a result of the storing therein of hot materials, it also limits the deformation thereof by engaging insert 15 which as shown is of relatively heavy section. Hence, upon a pressure build-up within filler 11 the bottom wall of stopper 14 of the closure may tend to deform upwardly. However, this deformation is terminated upon engagement of reinforcing section 22 with insert 15, thereby preventing a rupture of the seal between the side wall of the hollow stopper portion 16 and the upper edge or rim of filler 11.

As is illustrated clearly in Fig. 1, for example, a predetermined deformation of the bottom wall is accommodated by the spacing between the reinforcing section and the lower surface of the insert. It will be observed, however, that the extent of deformation permitted is less than the edge-to-center depth of the convex bottom wall. Accordingly, the permissible deformation of the bottom wall is less than that amount which would cause the bottom wall to assume a concave form. As illustrated in Fig. 1 the closure may be filled or partially filled with an insulating material such as ground cork or the like to minimize a heat exchange through the closure.

The container also includes a cup 25 provided with threads at its mouth which may be removably secured over the closure by engagement of its threads with corresponding threads formed externally on breast member 13 of the casing. For use with the closures illustrated in Figs. 1 and 2 particularly, the depth of cup 25 is such that the inner face of its bottom wall is flush with the closure to assure that it is firmly maintained in position despite the tendency of the pressure within the filler to force the closure out.

Turning now to Fig. 2, a modified form of closure according to my invention is illustrated which in substantially all respects is similar to the form illustrated in Fig. 1 except that a reinforcing section 22' is formed integral with insert 15' and stopper 14' contains no reinforcing section. The reinforcing section 22' again is
3. advantageously substantially cylindrical in form and is of such length that it extends substantially into engagement with the inner face of the bottom wall of stopper 14 when insert 15 is in place across the open mouth of the stopper.

In Fig. 3 a modified stopped is illustrated which is adapted to assist in maintaining itself in position on the filler neck. With the single exception that it is provided with a reentrant angle extension 30 on depending portion 18 of flange 17 it is similar in all respects to the stopper of either Fig. 1 or Fig. 2. The reentrant angle extension 30, however, makes it readily possible and easy to snap the depending portion 18 over an outwards extending circumferential flange of the permanent filler assembly, for example, rounded flange 19 of a pouring lip 10 which is otherwise similar to pouring lip 10 of Fig. 1. The flange 19 thus enters the undercut of depending portion 18 of the stopper and secures the latter properly positioned on the filler neck with its stopper portion 16 entering the mouth thereof and engaging the upper rim portion of its inner wall.

I claim:

1. An insulating closure for the open mouth of a container, such as a double-walled vacuum-insulated filler, comprising a hollow, generally cup-shaped unitary stopper body formed of resilient material and having a generally conical side wall and a convex bottom wall, said stopper body having an open upper end, a closure insert secured to said stopper body and extending across the upper end thereof to enclose the hollow interior of said body and form a hollow insulating space therein, and a substantially hollow structural reinforcing section formed integrally with one of said stopper body and insert parts and extending axially toward the other part, said reinforcing section comprising a wall spaced substantially outward from the center of said stopper body and substantially inward from the side wall thereof, the axial end of said reinforcing section terminating a predetermined distance short of said other part, whereby the end of said reinforcing section is positioned to engage the said other part upon predetermined deformation of said bottom wall, said predetermined deformation being less than that amount which would cause said bottom wall to assume a concave form.

2. A closure according to claim 1, in which said insert has an outwards extending peripheral bead and said stopper slide wall has an annular undercut just beneath the upper end thereof to receive said insert bead.

3. A closure according to claim 1 in which the substantially hollow reinforcing section is a cylindrical wall and extends from and is integral with the bottom wall of said stopper body, said reinforcing section having a length less by a predetermined amount than the distance between the inner faces of the insert and bottom wall.

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